



Blogger-Centric Contextual Advertising

Teng-Kai Fan, Chia-Hui Chang*

Department of Computer Science & Information Engineering, National Central University, No. 300, Jung-da Rd., Chung-li, Tao-yuan 320, Taiwan, ROC

ARTICLE INFO

Keywords:

Online advertising
Text mining
Machine learning
Marketing
Information retrieval
Language model

ABSTRACT

Web advertising (online advertising), a form of advertising that uses the World Wide Web to attract customers, has become one of the most commonly-used marketing channels. This paper addresses the concept of Blogger-Centric Contextual Advertising, which refers to the assignment of personal ads to any blog page, chosen in according to bloggers' interests. As blogs become a platform for expressing personal opinions, they naturally contain various kinds of statements, including facts, comments and statements about personal interests, of both a positive and negative nature. To extend the concept behind the Long Tail theory in contextual advertising, we argue that web bloggers, as the constant visitors of their own blog-sites, could be potential consumers who will respond to ads on their own blogs. Hence, in this paper, we propose using text mining techniques to discover bloggers' immediate personal interests in order to improve online contextual advertising. The proposed Blogger-Centric Contextual Advertising (BCCA) framework aims to combine contextual advertising matching with text mining in order to select ads that are related to personal interests as revealed in a blog and rank them according to their relevance. We validate our approach experimentally using a set of data that includes both real ads and actual blog pages. The results indicate that our proposed method could effectively identify those ads that are positively-correlated with a blogger's personal interests.

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1. Introduction

Blogsphere is a collective term comprising all blogs and their interconnections. A *blog*, short for *weblog*, is a type of web site that is usually maintained by a *blogger* who will publish serial journal posts containing news, comments, opinions, diaries, and interesting articles. As of December 2007, the blog search engine *Technorati*¹ was tracking more than 112 million blogs. Reports also indicate that about 1.2 million new blogs are being created worldwide each day. According to *Technorati*'s reports in April 2007, the number of blogs in the top 100 most popular sites has risen substantially. Hence, blogs continue to become more and more viable news and information outlets.

Blogs are also an increasingly attractive platform for advertisers. The majority of bloggers have advertising on their blogs. Marketers realize that bloggers are creating high-quality content and attracting growing and loyal audiences (*Technorati, 2008*). Hence, it is common for blogs to feature advertisements that either financially benefit the blogger or promote the blogger's favorite causes. Bloggers can be classified into three types (*Technorati, 2008*). *Personal* bloggers blog about topics on personal interests not associated with their work, *professional* bloggers mainly blog about their industries and professions but not in an official capacity for

their companies; and *corporate* bloggers usually blog for their companies in an official capacity. Statistics show that four out of five bloggers (about 79%) are personal bloggers. The majority of bloggers have advertising or another method of revenue generation on their blogs. Among bloggers who have advertising on their blogs, two out of three have contextual ads and one-third have affiliate advertising on their blogs (*Technorati, 2008*). On average, professional and corporate bloggers are more likely to include search ads, display ads and affiliate marketing, because they certainly understand what kinds of ads are suitable for their blogs. However, the majority of personal bloggers who have no specific idea which ads are proper to their web sites reply on reliable matching mechanisms used in contextual advertising. Hence, in this paper we hope to propose a contextual advertising mechanism that could increase click rates on personal blogs.

Contextual advertising is based on studies that show that 80% of internet users are interested in receiving personalized content on sites they visit (*ChoiceStream, 2005*). Since the topic of a page somehow reflects the interest of visitors, ads delivered to visitors should depend upon page content rather than upon stereotypes created according to their geographical locations or upon other demographic features, such as gender or age (*Kazienko & Adamski, 2007*). As shown in previous studies, strong relevance increases the number of click-throughs (*Chatterjee, Hoffman, & Novak, 2003; OneUpWeb, 2005; Wang, Zhang, Choi, & D'Eredita, 2002*). Some studies (*Fan & Chang, 2009; Zhang, Surendran, Platt, & Narasimhan, 2008*) have also demonstrated that focusing on relevant topics

* Corresponding author.

E-mail address: chia@csie.ncu.edu.tw (C.-H. Chang).

¹ <http://Technorati.com>.

My World

Sad

Very sad. The baby hasn't moved in two days. We are super duper worried and thinking about cancelling the trip to Europe. We're going to the doctors right now.

Relevant Ads

- Rent Italian Luxury Villa**
Private Five-Star Waterfront Villa
5-minute Stroll to Lake Como Center
www.VillaGallietta.com
- 25% Off NZ Bus Passes**
Huge discounts on selected passes
Get in quick, sale ends soon!
www.magicbus.co.nz
- Baz Bus - Hop on hop off**
Backpacker Bus around South Africa.
Flexible and safe way to travel.
www.bazbus.com
- Cheap Airline Tickets**
Mobissimo Helps You Find the Lowest Fares - Search 170 + Sites & Save!
www.Mobissimo.com
- Tokyo's largest hostel**
Reserve beds/rooms for the Tokyo's famous festivals in May and Junel
www.sakura-hostel.co.jp

Fig. 1. Example of a blog page with correlation ads.

written with positive sentiment produces high click-through rates. Although a page-relevant topic is a way to capture visitors' interest, there is no other way to determine their personal interests. However, since bloggers are constant visitors to their own blogs, and their interests or intentions are well expressed in the weblogs, an ad agency could use those expressed intentions to place interest-oriented ads.

For example, Fig. 1 shows a weblog with five ads related to *traveling* placed on the right. Since the content of this page describes reasons for cancelling a trip, these traveling ads are unlikely to be clicked. Instead, what the blogger needs is medical information or information on doctors. The point here is that an ad agency system could assign relevant ads according to bloggers' own interests, especially their immediate interest or intentions, for targeting ads, thus treating bloggers as the main visitors of their own blogs. To this end, even if an ad is related to the content of a linking page, an ad agency should preferentially consider the immediate interests expressed on the page (i.e., intentions) for placing ads.

In this paper, we proposed an ad matching mechanism, which we refer to as Blogger-Centric Contextual Advertising (BCCA), and which is based on latent interest detection to associate ads with blog pages. Instead of the traditional placement of relevant ads, BCCA emphasizes that the ad agency's system should provide relevant ads that are related to different levels of personal preferences in order to increase clicks. To evaluate our proposed method, we used a real-word collection comprised of ads and blog pages from Google AdSense and Google's Blog-Search Engine,² respectively. Our results show that the proposed approach, based on text mining can effectively recognize the latent interests (e.g., intentions) in a blog page, or the personal interests of the blogger. In addition, we further investigated the effects of ad page matching using an ad Click-Through-Rate (CTR) experiment, and our results suggest that our proposed method can effectively match relevant ads to a given blog page.

The rest of this paper is organized as follows: Section 2 provides background information on current online advertising. Section 3 introduces our methodology. The experimental results are presented in Section 4. Section 5 outlines some related work. Finally, we present conclusions and future directions in Section 6.

2. Background

There are two main categories of text-based advertising: *sponsored search* (or *keyword targeted marketing*) and *contextual advertising* (or *content targeted advertising*) (Anagnostopoulous et al., 2007; Broder, Fontoura, Josifovski, & Riedel, 2007).

Sponsored search, which delivers ads to users based on users' input query, can be used on sites with a search interface (e.g., search engines). Contextual advertising, on the other hand, is displayed on general web sites. These two techniques differ in that a sponsored search analyzes only the user's query key words, while content-based advertising parses the contents of a web page to decide which ads to show. However, the goals of each approach are consistent. The intent is to create a triple-win commercial platform. In other words, an advertiser pays a low price to purchase valuable advertisements, the ad agency system shares advertising profits with the web site owner (the publisher), and consumers can easily respond to ads to purchase products or services.

Contextual advertising involves an interaction between four players (Anagnostopoulous et al., 2007; Broder et al., 2007). The publisher, or the owner of a web site, usually provides interesting pages on which ads are shown. The publishers typically aim to engage a viewer, encouraging them to stay on their web page and, furthermore, attracting sponsors to place their ads on the page. The advertiser (the second player) supplies a series of ads to market or promote their products. The advertisers register certain characteristic keywords to describe their products or services. The ad agency system (the third player) is a mediator between the advertisers and the publishers; that is, it is in charge of matching ads to pages. The end user (the fourth player), who browses web pages, might interact with the ads to engage in commercial activities. In the pricing model of Cost Per Click (CPC), also known as Pay Per Click (PPC) (Feng, Bhargava, & Pennock, 2003), advertisers pay every time a user clicks on their ads. They do not actually pay for placing the ads, but instead they pay only when the ads are clicked. This approach allows advertisers to refine search keywords and gain information about their market. Generally, user clicks generate profits for both web site publishers and the ad agency system. A number of studies have suggested that strong relevance increases the number of ad clicks (Chatterjee et al., 2003; OneUp-Web, 2005; Wang et al., 2002). Hence, in this study, we similarly assume that the probability of a click for a given ad on a given page is determined by the ad's relevance score with respect to the page. For simplicity, we ignore the positional effect of ad placement and pricing models, as in (Anagnostopoulous et al., 2007; Broder et al., 2007; Lacerda et al., 2006; Ribeiro-Neto, 2005).

For many web 2.0 services, where publishers are responsible for content creation but do not host their own web sites, service providers sometimes play the role of ad agency. For example, many blog service or portal service providers (such as Facebook, MySpace, and Twitter) also have their own ad agency systems, which aim to generate profits while providing their services. As we realize that blog owners are constant visitors of their own web pages, bringing personal ads to bloggers becomes promising, since bloggers' profiles, opinions, short-term interests are expressed in their blogs. That is, the ad agency system of blog service providers could gain an advantage by providing the right message in the right context at the right time to bloggers. Note that this does not preclude targeting ads to visitors, but rather highlights a chance to target advertising to bloggers themselves. After all, advertising is about delivering the right message at the right time and in the right context to the right person (Adams, 2004; Kazienko & Adamski, 2007).

To explore the possibility of targeting advertising to bloggers, we conducted a simple survey of 62 bloggers about their experience in clicking ads and what types of advertisements on their blogs do they prefer. Among 50 participants who had experience clicking ads on their blogs, 40 of them indicated that they tend to click ads which are related to their interests and immediate requirements, while the other 10 participants randomly trigger ads without consideration of the correlation between ads and their

² <http://blogsearch.google.com>.

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